Project Title: Robotics Kit Replacement

Department/Organization: **Computer Science**

Project Applicant(s):

Principal Contact

Name: **Jianna Zhang**  MS 9165  Email: Jianna.Zhang@wwu.edu  Phone 3845

Others

Name: **Dan Van Pelt**  MS 9165  Email: Dan.VanPelt@wwu.edu  Phone 4841

Amount Requested for Project

Proposed Budget:

1. Equipment total  $ 22,167.78
2. Plus site preparation (not STF funded)  + $ 0
3. Total Project Cost (spreadsheet total from part III of this form, Total Project Budget)  = $ 22,167.78
4. Less organization’s contribution  – $ 0
5. Less site preparation  – $ 0
6. **STF Grant Request**  = $ 22,167.78

**IMPORTANT NOTE**

1. THE STF Committee will accept only complete proposals by the announced deadline. Every section (I–VIII) and all items of this proposal format must be addressed.

I. Relationship to STF Objectives / Impact on Current Academic Programs

The STF Committee will use as its *primary assessment criteria* the three objectives—**quality, access, and integration**—defined in the STF mission (above). Given this criteria, describe your proposed project in detail.

1. Tell us—focusing on what the students would gain from the project—how the project would provide positive benefits to specific courses or instructional programs. Specifically, answer at least one of a, b, and c below:

   a. How would this project **broaden or enhance the quality** of the student’s academic experience through the proposed technology?
The old NXT robotics kits were purchased with STF in 2008, and they need to be replaced with more current robot kits. The new kits proposed in this project employ vastly upgraded technology, compared to the existing NXT kits. This replacement is completely necessary. The proposed robotics technology will better enhance STEAM program in the CSE, and the University. Robotics classes combines subjects offered in separate CS and EEE classes, and emphasizes the application of knowledge to real-life situations, and environment. Students gain first-hand experience in quantitative and symbolic reasoning through the course of using these proposed robots with standard computer C language. This equipment will provide robotics experience for students who have no programming background, provide a simple but highly motivated introduction to programming through controlling robots, and provide students with a fun and exciting experience in quantitative and symbolic reasoning.

b. How would this project provide additional student access to technological resources?

First, we will provide access to all students of CSCI 172 which serves the entire campus as a GUR class, and secondly the CSCI 372, CSCI 572, and CS/EEE student senior projects and research. Currently, the WWU Student Robot Club has 154 students and 7 officers. They will gain additional access to new and/or previously retired robotics equipment. For individual senior projects, independent study projects, and research projects can also use the new and/or retired robotics equipment. We will provide as much optunity as possible for students to have access to these equipment.

c. How would this project increase integration of technology into coursework?

We use STEAM concept to increase the integration of cutting edge technology into our robotics classes. Artistic design on top of STEM is becoming an important part of higher education since creativity is an essential part of innovation. The robotics classes involve building robots and simulating real world environments. We use the robots to teach students to understand the connections between classroom concepts and the real world environment.

2. Would other departments be involved with this project?

   No ☒  Yes ☐ If yes, describe.

3. Has any part of this project previously been funded by the Student Technology Fee?

   No ☒  Yes ☐ If yes, describe.

   In 2008, STF program provided $13,850 to purchase the NXT Robot kits which we really need to replace. They are seriously out of date.

4. Is the proposed project a pilot project?

   No ☒  Yes ☐ If yes, describe.

II. Utilization

List the anticipated number of times and duration per each use—per quarter or per academic year—that students would use the proposed technology. The committee is looking for total student hours and total number of unique students who would use the technology in that period. Explain how you arrived at this utilization.
About 6,500 hours/quarter: The told number of student hours for 65 students (average number of students per quarter and at least 10h/week; average 100h/quarter). Students will use the robot kit all the time through out the quarter instead of hourly use for printers or microscope. That is, students have to use them for homework, labs, research, and/or project continuously everyday during the quarters.

About 290 unique students: The number of students in the robotics classes per academic year: 160 students from WWU robot club + 10 student projects + 120 students from Robotics Course Offered by CS department: The number of students outside of these class

Typically, about 25% of students in the course are female, more than double the percentage in other Computer Science courses. The kits are also used by the WWU Student Robot Club, which has more than 160 students of all majors in 2017-2018. We also use them to host Robot Festivals, competitions, C2C, B2B, WWU Summer Robot Camp, and to promote interests in AI and robotics for young students in public schools and in the broader community.

III. Project Budget

This section details the estimated total cost of the project. Include costs that would be covered—by your department or another source—for ongoing costs such as personnel or operating expenses.

1. For assistance in preparing your budget, please consult with relevant campus support departments (Academic Technology & User Services, Budget Office, Purchasing, Space Administration, etc.).

2. For more information about these contacts and helpful tools/links: from the STF website home page (http://www.wwu.edu/stf), choose “STF Tech Initiatives” on sidebar, then section “II. Tech Initiatives Instructions and Forms.”

Attach an Excel spreadsheet if you have additional details.

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Item Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45</td>
<td>439.99</td>
<td>19,799.55</td>
</tr>
</tbody>
</table>

Subtotal

Allowance for price increases (3% of subtotal)

Shipping (taxable)

Tax (8.7%)

Total This budget total (or your attached spreadsheet total) should match the projected budget figure on page 1 of this proposal. (See box on page 1, line 3.)

22,167.78
Important Notes from the STF Committee:

- We recognize your proposed budget as an estimate. Final funding for successful projects will be established after thorough technical review; some costs may need adjusting due to price changes.

- We recommend that you include a 3 percent cushion to allow for price increases.

- We may impose special conditions on a proposal before approval. See STF Proposal Guidelines.

- Funding is not provided directly to departments for purchases. All purchasing is done via the Office of the VPIT/CIO and savings are retained in the Student Technology Fee fund.

3. What funding or contributions are available from your department or other sources?

Note: “Contribution” is defined as a monetary contribution. A vendor discount, for example, is not considered a contribution.

None

4. Could this project be divided into discrete elements that could be funded separately?

Note: A “no” response to this question creates an “all or nothing” proposal. That is, if the STF Committee decides against funding your entire proposal, it will not consider any elements for partial funding. If elements could be funded separately, the applicant is responsible for prioritizing them before submitting the proposal.

No ☒ Yes ☐ If yes, summarize and prioritize project elements with cost estimate for each.

5. Are course or lab fees charged for any of the courses that will use this equipment?

No ☐ Yes ☒ If yes, describe. Please note: The total funding requested from the Student Technology Fee must reflect the amount collected from course fees for equipment replacement and/or equipment acquisition.

All of them: CSCI 172 ($13.93 Per/Cr);
CSCI 372 ($13.93 Per/Cr);
CSCI 572 ($13.93 Per/Cr);

IV. Impact on Existing Resources

Your proposal must address the project’s potential impact on existing resources. Give special attention to the impact on data transmission networks (e.g., sources accessed, networking equipment, etc.), and personnel (e.g., staffing, administrative support, faculty support, etc.).

1. Describe how existing equipment is used. Contrast this to projected use if your project were funded.

Will use for 160 students in the WWU Student Robot Club; for variety of student robot projects that can be senior projects, independent study, or research projects for CS and EEE majors and graduate students.

Will be used by faculties who do robotics research.

2. Is similar equipment or technology available elsewhere on campus—such as the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab?

No ☒ Yes ☐ If yes, describe why the existing equipment does not meet the needs outlined in
this proposal.

3. If this project involves the replacement of equipment, including computers:

   a. Describe the “before and after” configuration changes. (A spreadsheet reflecting these changes may be attached.) Or, write “N/A.”

      The hardware is and will be managed by a TA. Previously we had to deal with lost, damaged Lego parts and purchase new Lego parts every year. The new robotics kit has metal parts, which is strong and hard to loose. It is much easier to manage. It will reduce work load for CS supporting and TA.

      The software is still Robot C and the supporting staff will install and upgrade the software as usual. There should not be increasing load for TA or supporting staff except the instructor who must produce the new curriculum.

   b. Describe the costs and benefits of replacing vs. upgrading. Or, write “N/A.”

      These robot kits are completely different. If we were keep using old Lego kits and upgrading Lego hardware and software, it would not not solve the problem of hardware management difficulties and software configuration compatibility problems with Windows 10, which is a main platform of CS department. The new robotics kits solve the hardware management problem and should not have any conflicts with Windows or Linux platforms. Purchasing the new robotics kits is more cost and benefits efficient than up grading Lego robotics kits.

4. Would this equipment be available to students outside of your department?

   No ☐ Yes ☒ If students outside of your department would use the proposed technology, describe how they would gain access, how equipment availability would be publicized, the hours/week when equipment would be available, and any costs that would apply.

   Classes are open to all majors. They will sign out a robot using the e-sign form and the robots are stored in the cabinets in the labs, CF 418 and CF 416. For any projects, students will get permission from a faculty member, who has been authorized to give students access to these robotics kits, will grant e-sign forms and give the students access.

5. Does this project involve the check-out of equipment to students?

   No ☐ Yes ☒ If yes, discuss whether or not the Student Technology Center/ATUS Loan Pool could be assigned this task.

   Because we have had support for many years, and this new equipment will reduce the supporting staff’s and TA’s work load. TA will spend more time on helping students instead of managing hundreds of Lego parts.

6. Does the department have adequate operating funds to provide ongoing maintenance and support?

   No ☐ Yes ☒ If yes, describe.

   The department pays for the replacement of Lego robot parts, and upgrading the software out of the operating funds for many years for robotics courses and research.
7. Does the department have adequate personnel funds to provide ongoing staff support for the project?

No ☐ Yes ☒ If yes, describe.

The CS Department has had support for robotics courses for many years (since 2003), and this new equipment will reduce the supporting staff’s and TA’s supporting time. TA will spend more time on helping students instead of managing hundreds of Lego parts.

V. Space and Site Information

This section addresses any space alteration or site preparation necessary for the proposed project. Site alterations include painting, holes in walls, security systems, carpeting, construction, lighting changes, or conversion of a lab or office.

Special Note: If this project would require any site preparation, or if this project would use any space not currently under your department’s control:

a. You must submit a draft proposal to Space Administration by March 12, 2018.

b. Space Administration and Facilities Management will then conduct a site survey and respond to you by March 23, 2018 about project feasibility, cost, and schedule.

c. You must include the site survey response with your final proposal.

1. Location for installation of equipment or technology:

CF 418 and CF 416

2. Would site modification be required?

No ☒ Yes ☐ If yes, describe the modifications (e.g., electrical, air, painting, lighting, security, network access, etc.).

3. Would this project use space not currently assigned to your department or area?

No ☐ Yes ☒ If yes, describe.

VI. Project Schedule

Describe your overall implementation schedule. (Remember that project awards are announced during spring quarter, and that projects are to be substantially completed by the end of the calendar year.) If any site preparation is involved (see section VI above), align your project schedule with the schedule provided by Space Administration and Facilities Management.

As soon as the equipment is available.

VII. Constraints

List or describe any external or internal factors/constraints that could affect your project schedule, project objectives, or the project budget (e.g., if external approval is required for curricular changes, or if funding must be received by a certain date).

None
VIII. Submitting the Proposal

1. Make sure your proposal does not exceed 12 pages (not including Tech Initiatives Summary Sheet).

2. Complete top portion of the 2018 Tech Initiatives Proposal Summary Sheet for the front of the proposal.

3. Electronically submit the proposal (Word version only) and the summary sheet (Word or PDF version) for prioritizing:
   a. Students: Submit by April 2 to AS VP for Academic Affairs at asvp.academics@wwu.edu.
   b. Faculty and staff: Submit by internal due date, per your unit’s process, which must be before proposal due date of April 4.

   Note: Step 4 is for the individuals prioritizing the submitted proposals.

4. Submit prioritized proposals:
   a. (student proposals) AS VP for Academic Affairs:
      i. Ensure AS President approval and priority are on Summary Sheet.
      ii. Email proposal (Word version only) and summary sheet (PDF only) to diane.bateman@wwu.edu (the STF Committee secretary) no later than April 4.
   b. (employee proposals) College Dean/unit head:
      i. Ensure appropriate approvals and priority are on Summary Sheet.
      ii. Email proposal (Word version only) and summary sheet (PDF only) to diane.bateman@wwu.edu (the STF Committee secretary) no later than April 4.

   Note: Paper copies of proposals are no longer required; please do not send.